6th European Conference on Computational Mechanics (ECCM 6)
7th European Conference on Computational Fluid Dynamics (ECFD 7)
11 – 15 June 2018, Glasgow, UK

A SIMPLE LINEAR TETRAHEDRAL ELEMENT FOR PLASTICITY: A NEW VARIATIONAL MULTISCALE APPROACH

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Key Words: *Plasticity, linear tetrahedral element, incompressibility, stabilized methods*

We propose a new stabilized linear finite element method for plasticity, which works equally well on hexahedral or tetrahedral grids. Tetrahedral grids are preferred when complex geometries need to be simulated. The novelty of the proposed approach resides in building a stabilizing operator based on the concept of effective shear modulus. The effective shear modulus is a measure of the effective shear strength of the material under plastic deformation. We provide a proof of stability and convergence of the method in the elastic and plastic case, and we demonstrate the performance of the method in a battery of classic tests.